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(81) 指定国 (表示のない限り、全ての種類の国内保護が  
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(54) Title: PIEZOELECTRIC CERAMIC COMPOSITION

(54) 発明の名称: 圧電磁器組成物

材料 No.	組成成分		主成分 $Pb_{0.97-1.01}(Mn_{0.04-0.16}Nb_{0.04-0.16})Ti_{0.97-1.01}Zr_{0.04-0.16}O_3$ ( $x-y+z=1$ )				電気特性 $Q_{max}$	機械的強度 $\sigma_{max}$ ( $N/mm^2$ )	耐熱性 $T_{95}$ ( $^{\circ}C$ )	Al含有相 の有無
	$Al_2O_3$ (wt%)	$SiO_2$ (wt%)	$x$ (mol)	$y$ (mol)	$z$ (mol)	$x$ (mol)				
1	0.1						120	155	0.11	x
2	0.3						125	172	0.07	○
3	0.5	0.01	0.99	0.10	0.53	0.37	138	179	0.08	○
4	0.7						130	182	0.07	○
5	1.0						133	182	0.07	○

A... SAMPLE No.  
B... MINOR COMPONENT  
C... MAIN COMPONENT  
D... ELECTRICAL CHARACTERISTIC  
E... MECHANICAL STRENGTH  
F... HEAT RESISTANCE  
G... AL-CONTAINING PHASE

(57) Abstract: Disclosed is a piezoelectric ceramic composition which is excellent in electrical characteristic  $Q_{max}$ , heat resistance and temperature characteristics of resonant frequency. This piezoelectric ceramic composition is characterized by comprising a phase mainly containing a lead zirconate titanate having a perovskite structure and an Al-containing phase. It is preferable for the main component of this piezoelectric ceramic composition to contain Mn and Pb and to have a chemical composition represented by  $Pb_{0.97-1.01}(Mn_{0.04-0.16}Nb_{0.04-0.16})Ti_{0.97-1.01}Zr_{0.04-0.16}O_3$  (wherein  $0.97 \leq x \leq 1.01$ ,  $0.04 \leq y \leq 0.16$ ,  $0.48 \leq z \leq 0.58$ ,  $0.32 \leq x \leq 0.41$ ).

(57) 要約: 電気特性  $Q_{max}$ 、耐熱性、さらには共振周波数の温度特性のいずれもが優れた圧電磁器組成物を提供する。この圧電磁器組成物は、ペロブスカイト型構造を有するチタン酸ジルコン酸鉛を主成分とする相と、Al含有相を含むことを特徴とする。この圧電磁器組成物は、主成分がMn及びNbを含有すること、さらに主成分が  $Pb_{0.97-1.01}(Mn_{0.04-0.16}Nb_{0.04-0.16})Ti_{0.97-1.01}Zr_{0.04-0.16}O_3$  (ただし、 $0.97 \leq x \leq 1.01$ 、 $0.04 \leq y \leq 0.16$ 、 $0.48 \leq z \leq 0.58$ 、 $0.32 \leq x \leq 0.41$ ) の組成

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## INTERNATIONAL SEARCH REPORT

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A. CLASSIFICATION OF SUBJECT MATTER  
Int. Cl.<sup>7</sup> C04B35/495, H01L41/187

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)  
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Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched  
Jitsuyo Shinan Koho 1922-1996 Jitsuyo Shinan Toroku Koho 1996-2005  
Kokai Jitsuyo Shinan Koho 1971-2005 Toroku Jitsuyo Shinan Koho 1994-2005

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)  
CA (STN), REGISTRY (STN)

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	JP 2000-327419 A (Murata Mfg. Co., Ltd.), 28 November, 2000 (28.11.00), Claims; table 1 & US 6299791 B1	1-16
Y	JP 2000-103674 A (Matsushita Electric Industrial Co., Ltd.), 11 April, 2000 (11.04.00), Claims; Par. Nos. [0013] to [0030] (Family: none)	1-16
Y	JP 2002-316871 A (Murata Mfg. Co., Ltd.), 31 October, 2002 (31.10.02), Claims; Par. Nos. [0034] to [0037]; table 1 (Family: none)	1-16

☒ Further documents are listed in the continuation of Box C.

☐ See patent family annex.

* Special categories of cited documents:	"I" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"A" document defining the general state of the art which is not considered to be of particular relevance	"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
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"O" document referring to an oral disclosure, use, exhibition or other means	
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## C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	JP 2002-60269 A (Murata Mfg. Co., Ltd.), 26 February, 2002 (26.02.02), Claims; Par. Nos. [0020], [0021]; table 2 & US 2002-41132 A1	1-16
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